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VARIATIONS IN TRILLIUM CERNUUM.

A. J. EAMES AND K. M. WIEGAND.

In the basin of Cayuga Lake in Central New York, there is but one known station for *Trillium cernuum*. In aspect the plants from this station seemed to differ considerably from the more familiar material of eastern Massachusetts, and therefore a thorough study of the species was undertaken at the Gray Herbarium. Two fairly well marked tendencies were found, one represented by eastern, the other by western plants, but not sufficiently distinct, however, to be regarded as specific. That these two forms seem to have been vaguely recognized by some other botanists in the past is apparent from the label of a specimen from Lake Superior collected by J. W. Robbins where the following quotation is found: "not rare but the only species seen by me at Lake Superior. Not *T. cernuum* of N. E. That has the peduncle of the flower curved but this is inclined below the leaves but straight."

As is well known¹ the identity of the *T. cernuum* of Linnaeus is in doubt. The description consists of three words only: "flore pedunculato cernuo," which is scarcely sufficient to define the name, as in several species the flowers are more or less nodding or declined. Two citations were given by Linnaeus, one to Colden and the other to Catesby. The habitat given by Linnaeus was "Carolina" referring probably to the Catesby citation. In the Linnaean Herbarium is a specimen collected by Kalm and named *T. cernuum*. Judging from the measurements given by Rendle this is probably the eastern form of *T. cernuum* mentioned above. The Catesby citation has been

Rendle, Journal of Botany xxxix. 332 (1901).

shown by Rendle to apply to *T. Catesbaei* Ell. and judging from Rendle's notes on the Colden citation the latter applies very doubtfully to *T. cernuum*, and more likely to *T. erectum*, as Colden is said to have described the flower as "rubropurpureus." It does not seem possible to settle this uncertainty at present. Meanwhile the name may be employed with its conventional significance.

The western form stands between the *T. cernuum* of the east and *T. declinatum* (Gray) Gleason, but seems to be distinct from the latter species though intergrading more or less with the former. These three plants may be distinguished as follows:

- a. Anthers 6-15 mm. long, twice as long as the filaments or more, yellowish white; petals 10-34 mm. broad, 20-50 mm. long; peduncles 3-12 cm. long, straight, horizontal or slightly reflexed; leaves usually not at all petiolate..... *T. declinatum*.
- a. Anthers 2.5-6.5 mm. long, one-third longer than the filaments or less, pinkish; petals 5-17 mm. broad, 15-26 mm. long; peduncles 0.5-4 cm. long, recurved or reflexed; leaves usually slightly constricted into an obscurely petiolate base.
 - b. Petals 5-9 mm. broad (averaging 7.6 mm.), oblong-lanceolate; mature anthers 2.5-4.5 mm. long (averaging 3.8 mm.); peduncles in flower 5-25 (-35) mm. long (averaging 15 mm.)..... *T. cernuum*.
 - b. Petals 10-17 mm. broad (averaging 13 mm.), oblong-oval or obovate; mature anthers 4-6.5 mm. long (averaging 5.4 mm.); peduncle in flower 12-40 mm. long (averaging 26 mm.), somewhat stouter..... var. *macranthum*.

T. DECLINATUM (A. Gray) Gleason, Bull. Torr. Bot. Club xxxiii. 389 (1906). *T. erectum* var. *declinatum* A. Gray, Man. ed. 5, 523 (1878). *T. cernuum* var. *declinatum* Farwell, Rep. Mich. Acad. Sci. xxi. 363 (1920).—Alluvial bottomlands: central New York to southern Minnesota, Tennessee and Missouri. The eastern limit given by Gleason is Ohio, but the species is frequent near LeRoy, southwest of Rochester, N. Y. and there is a specimen in the Gray Herbarium from Newark, Wayne Co., N. Y., collected by E. L. Hankenson in 1879. As correctly noted by Gleason this plant is related to *T. cernuum* and not to *T. erectum*. Like *T. cernuum* it has a pleasing odor when in flower (Gleason), is an inhabitant of lowland situations, and in proportion of leaf-length to height of plant is like that species. *T. erectum* inhabits wooded slopes, and flowers on the average nearly two weeks earlier than either *T. cernuum* or *T. declinatum*, has a dark purple ovary and generally longer stamens in relation to the length of styles. So far as there is evidence at hand *T. cernuum* is an inhabitant of mucky soil and *T. declinatum* of alluvium. The petals of the three forms under discussion in this paper are usually pure white, but several specimens of *T. declinatum* in the Gray Herbarium are described on the labels as pink or dark red and Farwell notes specimens with deep purple (*T. cernuum* var. *declinatum*

f. *Walpolei* Farwell) or brown purple (f. *Billingtonii* Farwell¹) petals, filaments, and stigmas at Ypsilanti, Michigan.

T. CERNUUM L. Sp. Pl. 339 (1753).—Low and mucky woodlands and copses chiefly in sandy noncalcareous regions along the coast: Newfoundland to eastern Pennsylvania and Delaware (West Virginia, Millspaugh; Georgia, Small, Britton). It extends inland to Coös County, New Hampshire, and Worcester County, Massachusetts, and is found locally on the sand plains about Albany, New York. A specimen collected by Macoun at Belleville, Ontario, is apparently the typical form though out of range.

Var. **macranthum** var. nov. Petalis ovato-oblongis ovalibus vel plerumque obovatis 10–17 mm. latis; antheris maturitate 4.5–6.5 mm. longis; pedunculis 12–40 mm. longis.—Flowers more showy than in the typical form with broader often obovate petals, larger anthers, longer peduncles and apparently somewhat larger fruit. The peduncles are generally straighter and more often deflexed than recurved, though this is not so marked toward the eastern portion of the range. At the local station the flowers as they grow older increase in size until the petals may reach a maximum width of 21 mm. and a length of 32 mm. The accrescence of the corolla is not so marked in the typical form. This variety inhabits alluvial or mucky soils chiefly in calcareous regions: Vermont, western Massachusetts and southeastern Pennsylvania to Minnesota, Saskatchewan and Mackenzie, chiefly in the vicinity of the Great Lakes. Specimens examined: VERMONT: Rutland, 1896, *W. W. Eggleston*; Fair Haven, 1916, *C. H. Knowlton*. MASSACHUSETTS: Sandstone area, Southwick, Hampden County, 1913, *J. Murdock, Jr. & C. Schweinfurth* (apparently this var.); Amherst, 1869, *G. Mackie*, 1886, *D. W. Rogers*. PENNSYLVANIA: Chester County, 1858–1864, *S. P. Sharples*, transitional. NEW YORK: Round Marshes, Dryden, 1914, *A. J. Eames & L. H. MacDaniels*, no. 2012 (TYPE in Gray Herb.); Lisbon, 1914, *O. P. Phelps*, no. 308 (not typical). MICHIGAN: vicinity of the Michigan Agricultural College, Lansing, 1895, *H. C. Skeels*, *C. F. Wheeler*; Keweenaw, 1863, *J. W. Robbins*, 1885, *O. A. Farwell*, no. 462. ONTARIO: Casselman, 1891, *Wm. Scott*, 1891, *J. M. Macoun*, no. 13,869, not typical. ILLINOIS: Ringwood, *G. Vasey*. WISCONSIN: Winnebago County, *W. A. Kellerman*. MINNESOTA: Spring Grove, 1902, *C. O. Rosendahl*, no. 269. MANITOBA: 1857, *Bourgeau*; Winnipeg, 1896, *J. M. Macoun*, no. 13,871; Portage la Prairie, 1906, *W. Herriot*, no. 78,379. SASKATCHEWAN: Carleton House, *Hooker dup.* MACKENZIE: Mackenzie River, old specimen. Material seen from the calcareous region of Aroostook County, Maine, was all in fruit. and its exact status could not be determined.

CORNELL UNIVERSITY, Ithaca, New York.

¹ Rep. Mich. Acad. xxi. 363 (1920).

SECOND REVISED LIST OF NEW ENGLAND
HEPATICAЕ.¹

ALEXANDER W. EVANS.

IN 1903 the writer² published a preliminary list of New England Hepaticae, in which 123 species were reported. Of these, 75 were accredited to Maine, 81 to New Hampshire, 67 to Vermont, 76 to Massachusetts, 65 to Rhode Island, 94 to Connecticut, and 31 to all six of the New England States. From 1902 to 1912 a number of noteworthy species were discussed in this journal in a series of Notes on New England Hepaticae, many of the species representing additions to the flora. This series comprised ten numbers, the first appearing in November, 1902, and the last in November, 1912. In 1913 the writer³ published a Revised List of New England Hepaticae, in which much of the information found in these Notes was incorporated. In this list 177 species were reported, 123 being accredited to Maine, 130 to New Hampshire, 109 to Vermont, 97 to Massachusetts, 77 to Rhode Island, 134 to Connecticut, and 53 to all six states.

Since the appearance of the Revised List the series of Notes has been continued, seven additional numbers having been published, as follows: the eleventh in April, 1914 (**16**: 62-76); the twelfth in June, 1915 (**17**: 107-120); the thirteenth in April and May, 1916 (**18**: 74-85, 103-120. *pl.* 120 + *f.* 1-40); the fourteenth in December, 1917 (**19**: 263-272); the fifteenth in September, 1919 (**21**: 149-169. *pl.* 126 + *f.* 1-14); the sixteenth in December, 1921 (**23**: 281-284); and the seventeenth in May and June, 1923 (**25**: 74-83, 89-98). In these Notes considerable new information regarding the distribution of the New England species is given, and this is included in the Second Revised List found below. As in the preceding lists the sign + indicates that an herbarium specimen has been seen, the sign — that a printed record has been found. In accordance with the prevailing views on the classification of the Hepaticae more families are recognized in the new list than in the earlier lists. Of these families the first four belong to the order Marchantiales, the next eleven to the Jungermanniales, and the last to the Anthocerotales.

¹ Contribution from the Osborn Botanical Laboratory.

² Preliminary Lists of New England Plants,—XI, Hepaticae. RHODORA **5**: 170-173. 1903.

³ RHODORA **15**: 21-28. 1913. Full references to the first ten numbers of the Notes are given here.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
RICCIACEAE.						
<i>Riccia arvensis</i> Aust.	+	+	+	+	—	+
“ <i>Austini</i> Steph.					—	+
“ <i>Beyrichiana</i> Hampe				+		+
“ <i>crystallina</i> L.			+	+		+
“ <i>dictyospora</i> M. A. Howe						+
“ <i>fluitans</i> L.	+	+	+	+	+	+
“ <i>Frostii</i> Aust.			+			
“ <i>hirta</i> Aust.						+
“ <i>membranacea</i> Lindenb. & Gottsche						+
“ <i>sorocarpa</i> Bisch.				+		+
“ <i>Sullivantii</i> Aust.	+	+	+	+	+	+
<i>Ricciocarpus natans</i> (L.) Corda	+	+	+	+	+	+
SAUTERIACEAE.						
<i>Clevea hyalina</i> Lindb.			+			
REBOULIACEAE.						
<i>Asterella tenella</i> (L.) Beauv.	+	+	+	+	+	+
<i>Grimaldia fragrans</i> (Balb.) Corda			+	+	+	+
“ <i>pilosa</i> (Hornem.) Lindb.			+			
“ <i>rupestris</i> Nees			+			
<i>Reboulia hemisphaerica</i> (L.) Raddi	+	+	+	+	+	+
MARCHANTIACEAE.						
<i>Conocephalum conicum</i> (L.) Dumort.	+	+	+	+	+	+
<i>Lunularia cruciata</i> (L.) Dumort.	+		+	+	+	+
<i>Marchantia polymorpha</i> L.	+	+	+	+	+	+
<i>Preissia quadrata</i> (Scop.) Nees	+	+	+	+	+	+
RICCARDIACEAE.						
<i>Metzgeria conjugata</i> Lindb.	+	+	+	+	—	+
“ <i>crassipilis</i> (Lindb.) Evans			+	+		+
“ <i>furcata</i> (L.) Dumort.	+	+	+			+
“ <i>pubescens</i> (Schrunk) Raddi	+	+	+			
<i>Pallavicinia Flotowiana</i> (Nees) Lindb.	+	+	+	+		+
“ <i>Lyellii</i> (Hook.) S. F. Gray	+	+	+	+	+	+
<i>Riccardia latifrons</i> Lindb.	+	+	+	+	+	+
“ <i>multifida</i> (L.) S. F. Gray	+	+	+	+	+	+
“ <i>palmata</i> (Hedw.) Carruth.	+	+	+	—	—	+
“ <i>pinguis</i> (L.) S. F. Gray	+	+	+	+	+	+
“ <i>sinuata</i> (Dicks.) Lindb.				+	+	+
PELLIACEAE.						
<i>Blasia pusilla</i> L.	+	+	+	+	+	+
<i>Fossombronina brasiliensis</i> Steph.					—	+

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
PELLIACEAE						
<i>Fossombronia cristula</i> Aust.				+		+
“ <i>foveolata</i> Lindb.	+	+	+	+	+	+
“ <i>Wondraczekii</i> (Corda) Dumort.		+	+	+		+
<i>Pellia epiphylla</i> (L.) Corda	+	+	+	+	+	+
“ <i>Fabroniana</i> Raddi		+	+			+
“ <i>Neesiana</i> (Gottsche) Limpr.	+	+	+	+		+
CALOBRYACEAE.						
<i>Scalia Hookeri</i> (Lyell) S. F. Gray		+				
LOPHOZIACEAE.						
<i>Chiloscyphus fragilis</i> (Roth) Schiffn.	+	+		+		+
“ <i>pallescens</i> (Ehrh.) Dumort.	+	+	+	+	+	+
“ <i>polyanthos</i> (L.) Corda	+	—	—	—	—	+
“ <i>rivularis</i> (Schrad.) Loeske	+	+	+	+	+	+
<i>Geocalyx graveolens</i> (Schrad.) Nees	+	+	+	+	+	+
<i>Gymnomitrium concinnatum</i> (Lightf.) Corda	+	+				
“ <i>corallioides</i> Nees	+	+				
<i>Harpanthus Flotowianus</i> Nees		+				
“ <i>scutatus</i> (Web. & Mohr) Spruce	+	+	+	+	+	+
<i>Jamesoniella autumnalis</i> (DC.) Steph.	+	+	+	+	+	+
<i>Jungermannia cordifolia</i> Hook.	+	+	+			+
“ <i>lanceolata</i> L.	+	+	+	+	—	+
“ <i>pumila</i> With.	+	+	+	+	—	+
“ <i>sphaerocarpa</i> Hook.	+	+				
<i>Lophocolea alata</i> Mitt.				+		+
“ <i>bidentata</i> (L.) Dumort.	—		—	+	—	+
“ <i>heterophylla</i> (Schrad.) Dumort.	+	+	+	+	+	+
“ <i>minor</i> Nees	+	+	+	+	+	+
<i>Lophozia alpestris</i> (Schleich.) Evans	+	+	+	+		+
“ <i>attenuata</i> (Mart.) Dumort.	+	+	+	+		+
“ <i>badensis</i> (Gottsche) Schiffn.		+	+			+
“ <i>barbata</i> (Schmid.) Dumort.	+	+	+	+		+
“ <i>bierenata</i> (Schmid.) Dumort.	+	+	+	+	+	+
“ <i>confertifolia</i> Schiffn.	+	+	+			
“ <i>excisa</i> (Dicks.) Dumort.	+	+			+	+
“ <i>Floerkii</i> (Web. & Mohr) Schiffn.			+			
“ <i>grandiretis</i> (Lindb.) Schiffn.			+			
“ <i>Hatcheri</i> (Evans) Steph.	+	+				
“ <i>heterocolpa</i> (Thed.) M. A. Howe	+	+	+			
“ <i>incisa</i> (Schrad.) Dumort.	+	+	+	+	—	+
“ <i>inflata</i> (Huds.) M. A. Howe	+	+	+	+		+
“ <i>Kaurini</i> (Limpr.) Steph.	+	+	+			
“ <i>Kunzeana</i> (Hüb.) Evans	+	+				

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
LOPHOZIACEAE.						
<i>Lophozia longidens</i> (Lindb.) Macoun	+	+	+			+
“ <i>longiflora</i> (Nees) Schiffn.	+	+				
“ <i>lycopodioides</i> (Wallr.) Cogn.	+	+				
“ <i>marchica</i> (Nees) Steph.	+	+	+			+
“ <i>Mildeana</i> (Gottsche) Schiffn.	+	+	+	+	+	+
“ <i>obtusata</i> (Lindb.) Evans	+					
“ <i>porphyroleuca</i> (Nees) Schiffn.	+	+	+	+		+
“ <i>quinquedentata</i> (Huds.) Cogn.	+	+	+			+
“ <i>ventricosa</i> (Dicks.) Dumort.	+	+	+	+	—	+
<i>Marsupella aquatica</i> (Lindenb.) Schiffn.	+	+				
“ <i>emarginata</i> (Ehrh.) Dumort.	+	+	+	+		+
“ <i>sparsifolia</i> (Lindb.) Dumort.			+			
“ <i>sphacelata</i> (Gieseke) Dumort.		+	+			
“ <i>Sullivantii</i> (DeNot.) Evans	+	+	+	+		+
“ <i>ustulata</i> (Hübner.) Spruce	+	+				
<i>Mylia anomala</i> (Hook.) S. F. Gray	+	+	+	+	—	+
“ <i>Taylori</i> (Hook.) S. F. Gray	+	+	+			
<i>Nardia crenulata</i> (Sm.) Lindb.	+	+	+	+	+	+
“ <i>crenuliformis</i> (Aust.) Lindb.				+		+
“ <i>fossombronioides</i> (Aust.) Lindb.						+
“ <i>geoscyphus</i> (DeNot.) Lindb.	+	+		+		+
“ <i>hyalina</i> (Lyell) Carringt.	+	+	+	+		+
“ <i>obovata</i> (Nees) Lindb.	+	+	+			
“ <i>obscura</i> Evans	+	+	+	+		+
“ <i>scalaris</i> (Schräd.) S. F. Gray	+					
<i>Pedinophyllum interruptum</i> (Nees) Schiffn.						+
<i>Plagiochila asplenioides</i> (L.) Dumort.	+	+	+	+	+	+
“ <i>Austini</i> Evans		+	+			+
<i>Sphenolobus exsectaeformis</i> (Breidl.) Steph.	+	+	+			+
“ <i>exsectus</i> (Schmid.) Steph.	+	+	+	+		+
“ <i>Hellerianus</i> (Nees) Steph.	+	+	+	+	—	+
“ <i>Michauxii</i> (Web. f.) Steph.	+	+	+	+		+
“ <i>minutus</i> (Crantz) Steph.	+	+	+	+		

CEPHALOZIELLACEAE.

<i>Cephaloziella bifida</i> (Schreb.) Schiffn.	+		+	+		+
“ <i>byssacea</i> (Roth) Warnst.	+	+	+	+		+
“ <i>elachista</i> (Jack) Schiffn.	+	+	+	+	+	+
“ <i>Hampeana</i> (Nees) Schiffn.	+	+	+	+	+	+
“ <i>myriantha</i> (Lindb.) Schiffn.	+	+	+	+	+	+
“ <i>papillosa</i> (Douin) Schiffn.				+		+
“ <i>spinicaulis</i> Douin						+
“ <i>Sullivantii</i> (Aust.) Evans	+	+		+		

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
CEPHALOZIACEAE.						
<i>Bazzania denudata</i> (Torr.) Trevis.	+	+	+	+		+
“ <i>tricrenata</i> (Wahlenb.) Trevis.	+	+	+			
“ <i>trilobata</i> (L.) S. F. Gray	+	+	+	+	+	+
<i>Calypogeia fissa</i> (L.) Raddi	+	+		+		
“ <i>Neesiana</i> (Massal. & Carest.) K. Müll.	+	+	+	+		+
“ <i>paludosa</i> Warnst.	+	+	+	+	+	+
“ <i>sphagnicola</i> (Arn. & Perss.) Warnst. & Loeske	+	+	+			+
“ <i>suecica</i> (Arn. & Perss.) K. Müll.	+	+	+			+
“ <i>Sullivantii</i> Aust.	+	+		+	+	+
“ <i>Trichomanis</i> (L.) Corda	+	+	+	+	+	+
<i>Cephalozia bicuspidata</i> (L.) Dumort.	+	+	+	+		+
“ <i>catenulata</i> (Hüb.) Spruce	+	+	+	+	—	+
“ <i>connivens</i> (Dicks.) Lindb.	+	+	+	+	+	+
“ <i>curvifolia</i> (Dicks.) Dumort.	+	+	+	+	+	+
“ <i>fluitans</i> (Nees) Spruce	+	+	+	+	+	+
“ <i>Francisci</i> (Hook.) Dumort.	+	+		+		
“ <i>Loitlesbergeri</i> Schiffn.						+
“ <i>Macounii</i> Aust.	+	+				
“ <i>macrostachya</i> Kaal.	+	+	+	+	+	+
“ <i>media</i> Lindb.	+	+	+	+	+	+
“ <i>pleniceps</i> (Aust.) Lindb.	+	+	+			+
<i>Lepidozia reptans</i> (L.) Dumort.	+	+	+	+	+	+
“ <i>setacea</i> (Web.) Mitt.	+	+	+	+		+
“ <i>sylvatica</i> Evans	+	—		+	+	+
<i>Odontoschisma denudatum</i> (Mart.) Dumort.	+	+	+	+	—	+
“ <i>elongatum</i> (Lindb.) Evans	+	+				
“ <i>prostratum</i> (Sw.) Trevis.				+	+	+
PTILIDIACEAE.						
<i>Anthelia Juratzkana</i> (Limpr.) Trevis.		+				
<i>Blepharostoma trichophyllum</i> (L.) Dumort.	+	+	+	+		+
<i>Ptilidium ciliare</i> (L.) Nees	+	+	+	+	—	+
“ <i>pulcherrimum</i> (Web.) Hampe	+	+	+	+	+	+
<i>Temnoma setiforme</i> (Ehrh.) M. A. Howe	+	+	+			
<i>Trichocolea tomentella</i> (Ehrh.) Dumort.	+	+	+	+	+	+
SCAPANIACEAE.						
<i>Diplophyllum albicans</i> (L.) Dumort.	+					
“ <i>apiculatum</i> (Evans) Steph.	+		+	+	+	+
“ <i>gymnostomophilum</i> Kaal.	+		+			
“ <i>taxifolium</i> (Wahlenb.) Dumort.	+	+	+	+		+
<i>Scapania apiculata</i> Spruce	+	+				
“ <i>convexula</i> K. Müll.	+					
“ <i>curta</i> (Mart.) Dumort.	+	+	+	+		+

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
SCAPANACEAE.						
<i>Scapania dentata</i> Dumort.	+	+	+	+		+
“ <i>glaucocephala</i> (Tayl.) Aust.		+	+			
“ <i>hyperborea</i> Jörgensen	+	+				
“ <i>irrigua</i> (Nees) Dumort.	+	+	+			+
“ <i>nemorosa</i> (L.) Dumort.	+	+	+	+	+	+
“ <i>Oakesii</i> Aust.	+	+	+			
“ <i>paludicola</i> Loeske & K. Müll.	+	+	+			+
“ <i>paludosa</i> K. Müll.	+	+	+			+
“ <i>subalpina</i> (Nees) Dumort.	+	+				
“ <i>umbrosa</i> (Schrad.) Dumort.	+	+				
“ <i>undulata</i> (L.) Dumort.	+	+	+	+	+	+
RADULACEAE.						
<i>Radula complanata</i> (L.) Dumort.	+	+	+	+	+	+
“ <i>obconica</i> Sulliv.	+		+	+		+
“ <i>tenax</i> Lindb.	+	+	+	+	—	+
PORELLACEAE.						
<i>Porella pinnata</i> L.	+	+	+	+	+	+
“ <i>platyphylla</i> (L.) Lindb.	+	—	+	—	—	+
“ <i>platyphylloidea</i> (Schwein.) Lindb.	+	+	+	+	+	+
LEJEUNEACEAE.						
<i>Cololejeunea Biddlecomiae</i> (Aust.) Evans	+	+	+	+	—	+
<i>Frullania Asagrayana</i> Mont.	+	+	+	+	+	+
“ <i>Brittoniae</i> Evans	+	+	+	+	+	+
“ <i>eboracensis</i> Gottsche	+	+	+	+	+	+
“ <i>inflata</i> Gottsche						+
“ <i>Oakesiana</i> Aust.	+	+	+			
“ <i>plana</i> Sulliv.					—	+
“ <i>riparia</i> Hampe		+	+	—		+
“ <i>saxicola</i> Aust.						+
“ <i>Selwyniana</i> Pears.	+	+	+			
“ <i>squarrosa</i> (R. Bl. & N.) Dumort.					—	+
“ <i>Tamarisci</i> (L.) Dumort.	+			+		+
<i>Jubula pennsylvanica</i> (Steph.) Evans	+	+	+	+	—	+
<i>Lejeunea cavifolia</i> (Ehrh.) Lindb.	+	+	+	+	—	+
“ <i>patens</i> Lindb.	+					+
<i>Leucolejeunea clypeata</i> (Schwein.) Evans		+		+		+
“ <i>unciloba</i> (Lindenb.) Evans					+	
ANTHOCEROTACEAE.						
<i>Anthoceros carolinianus</i> Michx.						+
“ <i>crispulus</i> (Mont.) Douin		+	+	+		+
“ <i>laevis</i> L.	+	+	+	+	+	+
“ <i>Macounii</i> M. A. Howe	+	+				+
“ <i>punctatus</i> L.	+	—	—	+		+
<i>Notothyas orbicularis</i> (Schwein.) Sulliv.	+	+	+	+	—	+

NOTES ON THE PRECEDING LIST.

It will be seen that this Second Revised List includes 196 species, a gain of 19, or nearly 11 per cent. over the first Revised List. From Maine 151 species are now reported, a gain of nearly 23 per cent.; from New Hampshire, 154 species, a gain of about 18 per cent.; from Vermont, 137 species, a gain of nearly 26 per cent.; from Massachusetts, 121 species, a gain of nearly 25 per cent.; from Rhode Island, 82 species, a gain of about 6 per cent.; from Connecticut, 147 species, a gain of nearly 10 per cent.; and from all six states, 67 species, a gain of about 28 per cent. The increases during the last ten years are naturally less striking than those between 1903 and 1913 (see RHODORA 15: 26).

The list includes the following additions to local state floras, made during 1923: *Riccardia latifrons* for Rhode Island, the record being based on specimens collected by the writer at Westerly; *Pellia Neesiana* for Vermont, based on specimens collected by Miss Lorenz at Ripton; and *Lejeunea patens* for Connecticut, based on specimens collected by Miss Lorenz at Thomaston. The writer has likewise collected *Riccardia multifida*, *Chiloscyphus pallescens*, *Harpanthus scutatus* and *Cephalozia curvifolia* at Westerly, so that the Rhode Island records for these species are now given the + sign.

If the Second Revised List is compared with the first a number of differences become apparent. Some of these represent additions and others changes in names, the latter being largely due to modifications in the interpretation of genera and species. For the sake of convenience the differences between the lists are summarized below, with references to the Notes, the Roman numeral in each case indicating the number in the series and the Arabic numeral the page.

ADDITIONS: *Riccia Frostii* (XIV, 264); *Clevea hyalina* (XI, 62); *Grimaldia rupestris* (XI, 64, as *Neesiella rupestris*); *Fossombronina cristula* (XII, 107); *Scalia Hookeri* (XIV, 266); *Harpanthus Flotowianus* (XIV, 268); *Lophocolea alata* (XII, 111); *Lophozia grandiretis* (XI, 63); *Nardia fossombroniioides* (XVI, 281); *N. obscura* (XV, 159); *Cephalozia spinicaulis* (XII, 117); *Bazzania denudata* (XVII, 89); *Calypogeia fissa* (XIV, 271); *Cephalozia Loitlesbergeri* (XV, 168); *C. macrostachya* (XII, 114); *Diplophyllum gymnostomophilum* (XI, 71); *Scapania hyperborea* (XVI, 282); *S. Oakesii* (XIII, 75); *S. paludicola* (XIII, 77); *Porella platyphyllodea* (XIII, 109); *Lejeunea patens* (XVII, 97).

CHANGES OF NAMES: *Ricciella crystallina*, *R. fluitans*, *R. membranacea* and *R. Sullivantii* (of the first Revised List) are replaced in the genus *Riccia* (XVII, 74); *Neesiella pilosa* and *N. rupestris* are included in the genus *Grimaldia* (XVII, 75); *Fossombronina salina* is superseded by *F. brasiliensis* (XVII, 75); *Plagiochila Sullivantii* (of list) is now *P. Austini* (XI, 68); *Calypogeia tenuis* is now *C. paludosa* (XII, 119); *Cephalozia serriflora* again becomes *C. catenulata* (XII, 112); *Diplophyllia albicans*, *D. apiculata* and *D. taxifolia* are placed in the genus *Diplophyllum* (XI, 74); *Scapania gracilis* (of list) is included under *S. nemorosa* (XIII, 75); *Porella rivularis* (of list) is included under *P. platyphylla* (XII, 109).

YALE UNIVERSITY.

NOTES ON *TRIOSTEUM PERFOLIATUM* AND RELATED SPECIES.

K. M. WIEGAND.

For many years the *Triosteums* of Central New York have given trouble to botanists. In 1918 the writer described a variety from this region (var. *glaucescens*, RHODORA xx. 116) but this did not entirely solve the difficulty. Two large and thrifty patches of the smooth-leaved type were found nearly 25 miles apart in which some individuals had broadly perfoliate leaves while the leaves of others in the same patch were entirely separate at the base. A careful comparison of various features of the leaves, flowers, and fruits, character by character, showed absolutely no other difference. These perfoliate-leaved plants could scarcely be interpreted as hybrids of *T. perfoliatum* and *T. aurantiacum* as only one other collection of plants with perfoliate leaves has been made in the entire basin of Cayuga Lake. This perplexing situation has led to a study of the whole group at the Gray Herbarium and through several seasons at Ithaca.

In his original paper on *T. aurantiacum* Bicknell¹ gave twenty-five differences between *T. perfoliatum* and *T. aurantiacum*. In this paper *T. perfoliatum* was said to differ from the latter species as follows: (1) the principal leaves strongly perfoliate instead of separate;

¹ Torreyia i. 25 (1901).

(2) upper leaves sometimes separate instead of sometimes perfoliate; (3) internodes shorter; (4) plant stouter; (5) plant more leafy; (6) leaves more rugose, (7) thicker, (8) paler beneath, (9) more densely soft-pubescent; (10) calyx-segments much shorter, (11) less foliaceous, (12) narrower, (13) more acute; (14) corolla often duller and greenish on lower half instead of dull purplish red, firmer; (15) the tube scarcely dilated or two-lipped instead of decidedly two-lipped and upwardly dilated; (16) the lobes shorter and more erect, (17) and scarcely surpassing the anthers; (18) style more exserted; (19) fruits more numerous (6-8 instead of 2-6) and more crowded, (20) more globose, (21) smaller, (22) dull greenish-orange instead of orange or bright orange-red; (23) an inhabitant of more sandy soil, (24) and of lower more level woods and thickets; (25) flowering about two weeks earlier. To these differences the writer may add as no. (26) a more densely crisp-pubescent stem in *T. perfoliatum*. A comparative study of about 175 herbarium specimens in addition to many in the field has failed to show that these differences are all valid. With the character of perfoliate leaves only nos. 9, 12, 13, 14, 15, 16, 18, 23, and 26 could be even generally correlated. Under most of the other numbers no differences could be found while some numbers were indiscriminately variable. Where the above differences seemed to correlate, the correlation was, however, chiefly in averages and the extremes overlapped very badly, showing tendencies rather than distinct groups. To a certain extent it was found that the same characters were not always combined, thus forming various combinations of characters. Sortings on different characters showed no possibility of making distinct groups, the only groups approaching distinctness being those given in the key below. Perfoliate leaves were found occasionally in the non-perfoliate group; dense crisp pubescence frequently in the group with normally loose villous pubescence; narrow acute sepals where these should be broad and blunt; non-flaring corolla where this should be flaring. A constant difference in length of stamens could not be made out. In the var. *glaucescens* the sepals were narrow or broad. Though originally not doubting that *T. perfoliatum* and *T. aurantiacum* were distinct species, the writer has now come to the belief that there is far too much intergrading to make possible the retention of both as species. It is therefore proposed to treat the North American *Triosteums* as in the following key. Because of the exceptions, the varieties under *T. perfoliatum* are best recognized

by the summation of the characters given and not by any one character. It has not been possible to interpret the numerous names proposed by Rafinesque.¹

- a. Sepals finely and for the most part evenly and densely pubescent; flowers 2-6 at each node; corolla pale- to deep-purple, 8-15 (-17) mm. long, densely and often crisply puberulent, more or less glandular; pubescence of the stem various; leaves narrowly to broadly ovate-oblong, finely strigose or subglabrate above with hairs which when present are 1 mm. long or usually less.
- b. Leaves velvety beneath.
 - c. Cauline hairs 1.5 mm. long or less, the majority very short and glandular.
 - d. Middle leaves usually perfoliate, densely velvety beneath; stem usually crisp-pubescent, often densely so; calyx-segments usually narrow (in flower 0.9-2.0 mm. wide, averaging 1.4 mm.), very acute; corolla pale, firm, the mouth 5-6 (-7) mm. in diam., usually not flaring; style usually exserted as much as 1.5-3.0 mm. *T. perfoliatum*.
 - d. Middle and other leaves usually not perfoliate, generally less velvety; stem usually villous; calyx-segments generally broader (in flower 1.5-2.8 mm. wide, averaging 2.0 mm.), obtuse or acute, generally more purple; corolla generally brighter and more purple, often thinner, the mouth 7-9 mm. in diam., usually more flaring; style rarely exserted. var. *aurantiacum*.
 - c. Cauline hairs 1.5-2.5 mm. long, nearly all of the long type; sepals with some marginal bristles; setae on upper surface of leaves up to 1 mm. long; approaching *T. angustifolium*. var. *illinoense*.
 - b. Leaves glabrous or nearly so beneath, not perfoliate; pubescence of calyx and corolla generally as in var. *aurantiacum*; sepals usually acute. var. *glaucescens*.
- a. Sepals hispid-ciliate, otherwise sparingly short-hispid or glabrous; flowers usually 2 at each node; corolla pale, 14-18 mm. long, loosely villous, slightly glandular, the lobes large and broad; stem setose-hispid, the hairs nearly all long (longest hairs 1.5-2.8 mm. long); leaves lanceolate to oblanceolate, distinctly hispid-strigose above with hairs 0.8-1.8 mm. long, not perfoliate.
- b. Leaves glabrous beneath or strigose on the nerves; lobes of the corolla broad. *T. angustifolium*.
- b. Leaves velvety beneath; the blade slightly broader and less acuminate; lobes of the corolla oblong; sepals more generally obtuse. var. *Eamesii*.

1. *T. PERFOLIATUM* L. Sp. Pl. 176 (1753). *T. majus* Michx. Fl. Bor.-Am. i. 107 (1803). Rocky woodland and open scrubby places in light soil: Massachusetts to the District of Columbia, in the mountains to North Carolina, and westward from Indiana and Tennessee to Wisconsin, Missouri, Kansas, and Nebraska. This is apparently a plant of the less rich and lighter, scarcely calcareous soils of the eastern slope of the Alleghany Mountains and of the

¹ New Flora of North America ii. 35-37 (1836).

upper Mississippi valley, extending on to Cape Cod in Massachusetts. It is structurally more constant than var. *aurantiacum*, the characters showing far fewer exceptions.

Var. **aurantiacum** (Bicknell) n. comb. *T. aurantiacum* Bicknell, *Torreyia* i. 26 (1901). In somewhat richer and heavier soil than the last: Quebec, New Brunswick, southern Maine, eastern Massachusetts, Connecticut, and New York to the mountains of Virginia, and from Ontario to Illinois and Wisconsin. This variety is variable as to the characters usually used in separating it from the typical form. Occasional specimens have perfoliate leaves, but all other characters normal. It is not unusual to find the type of pubescence characteristic of the variety combined with acute and often narrow sepals as in the typical form of the species, and the reverse combination is almost equally common.

Var. **illinoense** n. var. A var. *aurantiaco* recedit caulibus et calycis segmentis et foliorum pagina superiori longius setosis. Differing from var. *aurantiacum* in the longer hairs on the stem, sepals and upper leaf surface. Ohio and Illinois. OHIO: Columbus, 1837, *Sullivan*. ILLINOIS: Joliet, *H. C. Skeels*, no. 615; Oquawka, *Harry N. Patterson* (TYPE in Gray Herb.); Galva, 1878, *C. H. Ford*; Stevens Creek, *A. Gleason*; Mahomet, *U. E. Davis*. Plants of this variety appear related to *T. angustifolium* in length of hair on the stems, on the upper leaf-surfaces and on the margins of the sepals; but though *T. angustifolium* has been reported from Illinois there is no evidence that this variety is a hybrid of it with *T. perfoliatum* var. *aurantiacum*.

Var. **glaucescens** n. comb. *T. aurantiacum* var. *glaucescens* Wiegand, *RHODORA* xx. 116 (1918). Valley of Cayuga Lake in Central New York where it is as common as var. *aurantiacum*. The writer has seen only one other specimen, and this from Allegheny County, Pennsylvania (*J. A. Shafer*, no. 72). The specimen from Lebanon County, Pa., cited with the original publication of this variety, appears on further study to differ from the Ithaca material. It may be a hybrid of *T. perfoliatum* var. *aurantiacum* and *T. angustifolium*, as the long setae on the sepals and upper leaf-surface would suggest.

T. ANGUSTIFOLIUM L. Sp. Pl. 176 (1753). *T. minus* Michx. Fl. Bor.-Am. i. 107 (1803). Connecticut to Maryland and in the uplands to Alabama and Tennessee; also in Missouri and Illinois. Several perplexing collections have every appearance of being hybrids between this species and *T. perfoliatum* var. *aurantiacum* both structurally and in the local occurrence.

Var. **Eamesii** n. var. Foliis subtus velutinis; corollae laciniis oblongis; sepalis saepius obtusis.—Leaves velvety beneath, slightly broader and less acuminate than in the typical form of the species; lobes of the corolla oblong; sepals more generally obtuse. Stratford (and Milford), Connecticut, 1897, *E. H. Eames*; 1902, *Eames* (TYPE in Gray Herb.); also 1899, *J. R. Churchill*, and 1905, *H. S. Clark*. This has almost the appearance of a distinct species. Dr. Eames says

on his label: "Several colonies of large and small size in rocky copses near coast. The only known N. E. stations [of *T. angustifolium*?] are Milford and Stratford, Connecticut, where I have traced it for several miles in detached colonies." Except for the oblong lobes of the corolla these plants have every appearance of being hybrids of *T. perfoliatum* var. *aurantiacum* and *T. angustifolium*, but true *T. angustifolium* has been reported from Connecticut only from the Windsor region many miles away. A specimen collected by R. C. Bean and M. L. Fernald in Sheffield, Berkshire Co., Massachusetts, resembles the Eames specimens except in the corolla, which, though young, is more like that of *T. perfoliatum* and its varieties.

CORNELL UNIVERSITY, Ithaca, New York.

CERCIS CANADENSIS IN CONNECTICUT.¹

G. E. NICHOLS.

ABOUT fifteen years ago one of my students brought into the laboratory a twig of redbud, *Cercis canadensis*, which he had collected "somewhere on West Rock." West Rock is a trap ridge about 400 feet in height, situated on the outskirts of New Haven and site of the famous Judges' Cave. It is included in the New Haven city park system, but for the most part is in a natural condition, being very largely covered with second growth woodland. Since the redbud had not been recorded as a native plant northeast of New Jersey, it was assumed at the time that the specimen in question must have come from a planted tree; but subsequent inquiries from the superintendent of city parks elicited the information that no redbuds had ever been planted in the park, which covers an area of about 200 acres, and until recently the source of the specimen remained a mystery.

One day last May, however, as I was driving along the crest of the Rock, through woods that gleamed white with masses of blossoming dog-wood, my eye was caught by a mass of an entirely different color—the rose-pink of the redbud. The mystery was solved.

There they were, a clump of half a dozen good-sized individuals, ranging from half an inch to nearly two inches in diameter and up to about a dozen feet in height, together with two or three smaller plants.

¹Contribution from the Osborn Botanical Laboratory

The entire group occupies a piece of ground less than three feet in diameter, and very likely has originated through root suckering from a single plant. How the original plant got there is another question; but from the location of the station—near the summit of a rocky ridge which has never been inhabited, and fifty feet from the nearest road, from which it is separated by a tangle of wood and thicket—it seems certain that the plant was not introduced by human agencies. Moreover, the redbud here occupies essentially the same sort of habitat which it favors on trap ridges in eastern Pennsylvania: a moist, rocky depression in oak-hickory woods, where it grows associated with such other woody plants as basswood and butternut, silky cornel and high bush blueberry, bittersweet and grape. In short, I have no hesitation in accepting this Connecticut station for the redbud as representing a northeastward extension in the known natural range of the species, notwithstanding the fact that it apparently fails to propagate itself further by seed.

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